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AUTHOR von Zur-Muehlen, Max
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ABSTRACT

A profile of the socio-economic characteristics of the permanent residents of Canada holding an earned doctorate is presented. In 1973, there were 27,410 Canadian residents who had obtained an earned doctorate. (Holders of such professional doctoral degrees as Doctor of Medicine are excluded from this study.) Only 9 percent of the Ph.Ds were women. More than 89 percent of the Ph.Ds were between the ages of 30 and 53, and over 55 percent received their doctorate degrees between 1965 and 1973. Only 42.4 percent of the Ph.D population obtained their degrees at a Canadian university. About 32 percent of the Ph.Ds had been conferred in the United States, and 22.9 percent were conferred in European countries, particularly Great Britain. Slightly over 50 percent of the Canadian Ph.D population immigrated to Canada. Of the immigrants, 25 percent came from the United States, 25 percent from Great Britain, and 25 percent from other European countries. Over 60 percent of the Ph.Ds are working in the education sector, and over 65 percent of these Ph.Ds are under 45 years old, severely restricting the replacement opportunities in this sector. Male Ph.Ds hold 95 percent of the positions in most occupations and earn significantly higher salaries than female Ph.Ds. Fourteen tables present extensive data on the labor force status, age structure, geographic origin, immigration, income, employment, and legal residence of Canadian residents holding doctorate degrees. (SC)

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TABLE OF CONTENTS

LIST OF TABLES 3

INTRODUCTION 4

NUMBER AND LABOR FORCE STATUS OF PH.DS 5

AGE STRUCTURE OF PH.DS 6

PERIOD OF PH.D. COMPLETION AND GEOGRAPHIC ORIGIN OF DEGREE 6

THE IMMIGRATION OF PH.DS 7

EMPLOYMENT AND OCCUPATIONS OF PH.DS 8

INCOME AND SALARY STRUCTURE OF PH.DS 9

CONCLUSION 10

TABLES 12

LIST OF TABLES

		Page
TABLE I	Ph.Ds by Province of Residence and Sex, 1973	12
TABLE II	Labor Force Status of Male and Female Ph.Ds by Field of Study in Selected Disciplines, 1973	13
TABLE III	Ph.Ds and University Faculty by Field of Study in Selected Disciplines, 1973	14
TABLE IV	Age Structure of Ph.Ds, 1973	15
TABLE V	Year of Ph.D. Completion, 1973	16
TABLE VI	Geographic Origin of Ph.Ds, 1973	17
TABLE VII	Immigration of Ph.Ds by Province and Sex, 1973 ...	18
TABLE VIII	Foreign Born Ph.Ds by Country of Birth and Period of Immigration, 1973	19
TABLE IX	Employment of Ph.Ds by Industrial Sector and by Age, 1973	20
TABLE X	Selected Occupations of Ph.Ds by Sex, 1973	21
TABLE XI	Average Income of Ph.Ds by Year of Birth and by Sex, 1973	22
TABLE XII	Average Income since Award of Ph.D. Degree by Sex, 1973	23
TABLE XIII	Median Income by Industrial Sector and by Type of Degree, 1973	24
TABLE XIV	Average Male Income by Type of Degree in Selected Disciplines, 1973	25

PROFILE OF PH.DS IN CANADA

INTRODUCTION

The Highly Qualified Manpower Survey of 1973 provides a fascinating socio-economic profile of Canadians and landed immigrants who had achieved formal educational distinction by completing at least one university degree at the time of the 1971 Census.

This report will focus on the socio-economic characteristics of the Ph.D. population who were permanent residents of Canada. In 1973, Statistics Canada, on behalf of the Ministry of State for Science and Technology, conducted a postcensal survey of highly qualified manpower, i.e., university graduates.[1/]

This group represents, as measured by formal education attainment, the elite of a country. Only a fraction of one percent of the labor force possesses an earned doctorate. Most of them have spent 8 to 10 years in university. It has been estimated that in Canada, the replacement cost to educate and train each Ph.D. would now be $80,000 to $100,000. Expressing it differently, replacement of the 27,410 Ph.Ds in Canada would require an investment between $1,4 and $2,7 billion dollars in educational costs.

Under these circumstances, it is of interest to explore the socio-economic characteristics of this segment of our society. From the unique data of the Highly Qualified Manpower Survey, a number of questions can now be answered about the Ph.D. population. Who and where are they? How many are females? What were their fields of study, their age structure and income? When was the Ph.D. obtained, how many have immigrated, and from where and when? What type of employment and occupations have they selected and what was their salary level?

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1/Preliminary results of this survey have been used to develop the tables on the Ph.D. population in Canada, but without an opportunity to review the statistical reliability of the data. This survey includes not only those who had Ph.Ds by 1971, but also persons who held a bachelor's or master's degree in 1971 and subsequently obtained their doctorate between the 1971 Census and the 1973 Highly Qualified Manpower Survey. Excluded are Ph.Ds who had immigrated to Canada since 1971, as well as Canadians studying abroad who returned after completing their doctorate after 1971. Therefore, the stock data for 1973 are under-reported by approximately 2,600 earned doctorates. Consequently, by the fall of 1973, about 30,000 Canadians and landed immigrants held this degree, compared with the 27,410 reported by the Highly Qualified Manpower Survey and discussed in this paper.

NUMBER AND LABOR FORCE STATUS OF PH.DS

As already mentioned, in 1973 there were 27,410 residents of Canada who had obtained an earned doctorate. Generally, these degrees are identified as a Doctor of Philosophy (Ph.D.), but also include other degrees such as Doctor of Science, Doctor of Education, Doctor of Business Administration and a variety of doctoral degrees from foreign universities whose quality might vary, but excluded are holders of professional doctoral degrees such as Doctor of Medicine, Doctor of Dentistry, and Doctor of Veterinary Medicine.

In Canada, most Ph.Ds were masculine; only 9% were females. In the Natural Sciences, this proportion was considerably lower whereas it was higher in some Humanities such as English, Modern Languages and Fina Arts.

The geographic distribution of the Ph.D. population shows the predominance of Ontario where 45.7% were located, compared with 35.7% of the total Canadian population. (Table I) The Atlantic Provinces and Quebec have proportionally fewer Ph.Ds than population statistics would have anticipated. This might reflect their educational structure and their stage of economic development.

As of fall 1973, 2.5% of the male Ph.Ds were not working on account of unemployment, sickness, further study and voluntary non-participation, but the percentage of female Ph.Ds not in the labor force was 10.2%. (Table II) The data do not provide genuine information about the unemployment rate of Ph.Ds. Indications are that the percentage is low indeed. This is not surprising if one considers that a Ph.D. could substitute, at a price, for lower level degrees such as bachelors and masters.

Of the 26,485 Ph.D. labor force participants, 4,600 had obtained their degrees in the Humanities (Table III). For example, there were 150 Ph.Ds in Classics, 915 in English, and 1,030 in Religion and Theology. The total number of Social Sciences Ph.Ds was 6,225 including 1,600 in Education, 1,535 in Psychology, 910 in Economics, and 165 in Anthropology. Agriculture and Biological Sciences had 3,125, Engineering and other Applied Sciences, 2,660, and the Health Professions and Occupations, 2,480. The Physical Sciences were the largest group with 7,425 Ph.Ds; Chemistry alone had 2,975, and Mathematics, Geology and Physics has well over 1,000 each.

As could be expected for all fields of study, 53.2% of Ph.Ds were teaching in Canadian universities in 1973. This percentage varies according to discipline, from highs of 87.8% and 86.3% in English and Mathematics, to lows of 33.9% in Chemistry, and 32.1% in Religion and Theology. In recent years, for the Humanities and Social Sciences, about two out of three Ph.Ds were employed by universities; by contrast, in the Natural Sciences, about 1 out of 2.2/

Statistics Canada had had a comprehensive data file on university teachers in Canada since 1956-57. Therefore, the results of the Highly Qualified Manpower Survey 1973, as it applies to university faculty, can be compared with the Statistics Canada data for all university teachers with a Ph.D. degree in 1973-74. The Statistics Canada information for 1973-74 should indicate more Ph.Ds., particularly in the Humanities and Social Sciences, than the Highly Qualified Manpower results because the latter exclude immigrant professors and returning Canadians who have come to Canada since 1971.

The most striking feature of this comparison is the similarity of results. The Statistics Canada data reported 15,901 university teachers with a Ph.D. for 1973-74 compared with 14,096 for the Highly Qualified Manpower Survey. For the Physical and Biological Sciences, the results of the two surveys were almost identical. In the Humanities and Social Sciences, Statistics Canada reported a larger number of university professors with Ph.D. degrees than the Highly Qualified Manpower Survey. This difference has already been explained. Because of these findings, one can place some confidence in the ability of the Highly Qualified Manpower Survey to provide an accurate socio-economic description of the Ph.D. population as of the fall of 1973.

AGE STRUCTURE OF PH.DS

The age structure of the Ph.Ds population in Canada shows that only 15.1% were above 53 years of age. (Table IV) More than 80% were between 30 and 53. If one considers that in most disciplines the Ph.D. is received at around 30, Ph.Ds in Canada are rather young. Consequently, the potential for replacement of those who hold positions is limited. Thus, prospects for the 15,000 Ph.D. students now studying in Canada or abroad are less than promising.3/

PERIOD OF PH.D. COMPLETION AND GEOGRAPHIC ORIGIN OF DEGREE

In conjunction with the age structure, it is of interest to explore the year of completion of the Ph.D. degree. In the eight-year period from 1965 to 1973, 55.7% received their Ph.D. degrees, while 9.6% had obtained their doctoral degrees before 1950. (Table V) Frequently,

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2/ This information has been derived from the annual employment survey of the Canadians Association of Graduate Schools.

7

3/ These data were estimated from the annual statistical report of the Canadian Association of Graduate Schools, and Canadian doctoral enrol-

these Ph.Ds had been awarded by European Universities to immigrants who subsequently came to Canada before World War II and during the early post-war years.

These data show that the large majority of Ph.Ds in Canada were conferred rather recently and, from a quality point of view, this is likely an advantage. In fact, doctoral programs in Canada (except the Natural Sciences, and some Humanities and Social Science programs at McGill and Toronto) were still developing in the sixties and early seventies. Therefore, it is not surprising that only 11,595 or 42.4% of the Ph.D. population obtained their degrees at a Canadian university. (Table VI) (Almost half (45.5%) of these Canadian degrees were awarded in Ontario). Another 31.9% (8,730) of the Ph.Ds had been conferred in the United States, and 22.9% (6,260) were the products of European institutions. Of the latter, 3,820 were from the United Kingdom; 815 from France and 430 from Italy and the Holy See, mostly Catholic priests. Australia, New Zealand and India provided over 500 Ph.Ds.

These data show Canada's dependence on the graduate education of other countries. These figures include Canadians who went abroad for their doctoral degrees as well as immigrants who either had acquired their doctoral degrees in their country of origin, or obtained it in a third country.

THE IMMIGRATION OF PH.DS.

The immigration statistics show that 13,915 or 50.8% of the Canadian Ph.D. population immigrated to Canada. 46.9% of these immigrants moved to Ontario, compared with 17.4% to Quebec. (Table VII) The proportion of foreign-born females with doctorates (10.6%) was slightly greater than the overall percentage of women in Canada who had Ph.Ds (9%).

The foreign-born Ph.Ds, by country of birth and period of immigration, show an interesting pattern. Of these immigrants, 25.0% came from the United Kingdom and 24.5% from the United States. India provided 7.5%, and almost 24.5% came from such European countries as Germany (3.5%), France (2.9%) and the Netherlands (1.8%). (Table VIII)

By period of immigration, 44.8% came to Canada between 1966 and June 1971. In the case of the United States, 2,110 of the 3,415 American immigrants with doctoral degrees came from 1966 to 1971. East bloc countries, such as the Soviet Union and Poland, provided a relatively large percentage of immigrants before 1955. Degree-holders from the United Kingdom came throughout the post-war period.

.../ 8

EMPLOYMENT AND OCCUPATIONS OF PH.DS

The employment pattern of Ph.Ds, by industrial sector shows that 62.4% (or 17,120) are working in education. (Table IX) The federal government employs 11.3% (3,090) compared with 2.7% (735) in the provincial governments, and 0.2% (50) in municipal governments. Since only about 13% of the Ph.D. population worked in the industrial sector, scarce employment opportunities in both government and education could be a cause for concern. This suggests that the training of Ph.D. students may be less suited to industrial employment, a possibility that requires further examination.

As already discussed, the age structure of the Ph.D. population is rather young. Fewer than one-third of those employed in education are older than 44, which means that the replacement rate (on account of retirement, death and disability) under normal conditions would be less than 1.5% annually. Therefore, about 300-450 openings are created each year, compared with the 2,000 Ph.Ds produced in Canada annually (including Canadians who received their doctorates abroad). This potential imbalance needs further exploration.

Ph.Ds in government are somewhat older: more than 42% are older than 44; and 80% of the 620 Ph.Ds in religious organizations, mostly Catholic priests, are 44 or older.

There is indirect evidence that since the mid-1960's, the overwhelming majority of Ph.Ds have been employed in educational institutions, where the replacement problem has now become particularly acute. The other sectors of the economy, industry and government, appear to have employed many of the older Ph.Ds, especially those who came from Europe during the early post-war years.

The occupations of Ph.Ds indicate the pre-eminence of university teachers, as already stated. But there are strong indications that the universities would have very few new university teachers in the future. In contrast, fewer than 1,000 were teachers in elementary-secondary education or in post-secondary non-university education. (Table X) This seems to confirm a widely held belief that Ph.D. employment prospects in teaching other than the university, have not been fully exploited by doctoral graduates.

Some occupations employ far fewer Ph.Ds than the number who have graduated. This applies especially to economists and psychologists. Only 195 economists identified themselves as such whereas, 910 Ph.Ds in Economics were in the labor force. The balance were likely employed as university teachers of Economics or Business Administration, and as administrators, managers and consultants to government and industry. Similarly, 365 Ph.Ds who listed their occupation as psychologist have to be compared with the 1,535 Ph.Ds in Psychology. The rest are probably working as teachers or in hospitals and administration. The same situation applies to a number of other occupations.

Clerical and related occupations were indicated by 110 Ph.Ds, and 165 were employed by the military or as police officers. Another 180 Ph.Ds were writers, editors, and in related occupations. In this context, the question arises, what is the relationship between field of study and occupation? For example, what is the ideal training for administrators or managers? It appears that many engineers with Ph.Ds, at least in the industrial sector, perform in this capacity.

For clearly defined occupations such as chemist, geologist, pharmacist, or in professions such as Theology, Law and Medicine, subject matter expertise is the overriding criterion, but for others, more generalized training in the Social Sciences and Humanities, as well as aspirations and motivations, become the critical factors.

Many authorities expressed concern about the apparent imbalance between present and future supply of Ph.Ds and anticipated demand. There might be the possibility, for example, that Ph.Ds in the Natural Sciences could be employed in occupations of a more general nature. Doubts have been expressed that this is a viable option for many forthcoming Ph.Ds, particularly since their training has been university-directed and often narrowly focussed, even within a discipline. It also does not resolve the public policy issue: should society allocate substantial financial resources to train Ph.Ds largely at public expense, in disciplines where little demand is forecast, especially in many of the Humanities, and some of the Physical Sciences.

Male Ph.Ds occupy 95 out of 100 positions in most occupations. Those like psychologists, teachers and pharmacists are held by slightly more females, but even here more than 3 out of 4 incumbents are male. This discrepancy is even more revealing in the next section of this report where salary differentials between the sexes are discussed.

INCOME AND SALARY STRUCTURE OF PH.DS

Salary level is a function of field of study, experience, type of industry, occupation and that of sex. The average income, for all ages, of male Ph.Ds in 1973 was $17,900 compared with $10,900 for females, a difference of $7,000.[4] (Table XI) For Ph.Ds born between 1920-1929, the difference was $10,400. The male segment of this age cohort earned $23,600 compared with $13,200 for the female group. One generally accepted explanation has been that because of family formation, females' years of experience may be considerably less and, therefore, the determining factor.[5]

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[4] The salary data include only those Ph.D. holders who worked 40 weeks or more during the year.

[5] This hypothesis could be tested with more refined tables from the Highly Qualified Manpower Survey, but at present, the discrepancy in salary is only noted. Also, the career profile of such Ph.D. holders could be traced if additional tables are prepared.

The average income pattern of Ph.Ds since attainment of the degree also varies by sex. The starting salary of Ph.D. holders within two years of graduation was $11,800 for males compared with $9,400 for females. Expressed differently, females earned 79.7% of the male income. These salary differences increase substantially for men and women who obtained their degrees in earlier periods. Females who had held Ph.Ds for 19 or more years, earned 53.9% of their male counterparts' average salary. In dollar terms, a male earned $22,800 whereas the average female's income was $12,300. Overall, for both sexes, the longer you have been in possession of a doctoral degree, the higher your average income.

Information on median income by industrial sector and by type of degrees shows that in education the income of those with a specialized undergraduate degree is $12,100; a masters degree, $15,000; and an earned doctorate, $13,200. In the federal government, bachelor's degree holders have a median income of $15,700 compared with $19,800 for those with a Ph.Ds. In industry, the income differential between a specialized undergraduate degree and the Ph.D. degree was less significant. For example, in business management, the median income for the first group was $17,700 compared with $18,900 for Ph.Ds.

It is also interesting to explore the income differential by field of study. With rather few exceptions, the average income for males with a Ph.D. was about $20,000. For some of the Humanities such as Classics and French, the average income was less than $18,000. But in certain professional areas such as Medicine and Surgery, as well as in Economics and Business Administration, average income was substantially higher; in the case of Medicine, $37,600, and $28,800 in Business Administration. Considering that it takes from four to six years to complete a doctorate, the difference in income between a specialized undergraduate degree and a doctorate degree appears small. The average income for males with a specialized undergraduate degree in 1973 was $16,700 compared with $19,600 for earned doctorates. For some fields of study, these differences were even less and in others, such as Law and Dentistry, holders of a first professional degree had, on average, higher incomes than those with doctorates.

CONCLUSION

In summary, the results of the Highly Qualified Manpower Survey as they relate to the Ph.D. population give an excellent overview of the socio-economic characteristics and work activities of the Ph.Ds in Canada as of 1973 (with the exceptions noted in footnote 1). They do not provide behavioural information on motivations or aspirations of Ph.Ds; nor measures of job satisfaction or underutilization.

.../ 11

Nevertheless, the quantitative data highlight important dimensions of some policy issues which require further study. Not only are there few female Ph.Ds, but they are paid considerably less than their male counterparts. Almost half of all Ph.Ds are located in one province. The majority of Ph.Ds have been employed in universities, and since their age structure is young, there will be relatively few replacement positions available. This may be aggravated by the fact that population trends suggest a decline in the 18-24 age group during the next decade (from about 3.3 million to 2.7 million), and hence, a smaller post-secondary student population (provided the participation rate for this age group does not increase to compensate).

In recent years, the large majority of Ph.D. holders in Canada received their doctoral training abroad, primarily in the United States and Great Britain. About half the present full-time doctoral enrolment in Canada is foreign-born, and over half of the 27,410 Ph.Ds in Canada were immigrants. A large number of them have come to Canada since 1966. Since the demand for Ph.Ds has shifted radically, a substantial imbalance might exist between the growing supply and a declining demand (although the numbers involved are small).

Other questions relative to the employment of Ph.Ds might be asked: how many immigrants with a Ph.D. degree will migrate to Canada, and how many Ph.D. residents (Canadians and landed immigrants) will move to other countries for employment?

A critical question is the underutilization of Ph.Ds whose training and aspirations are university-oriented although few positions are forthcoming in this sector. There might be a substantial (but difficult to document) misallocation of resources, if Ph.D. education has been university-directed, with limited options for alternative employment.

Industry and government have employed few Ph.Ds in recent years. On account of existing budgetary constraints by the federal and provincial governments, employment opportunities there appear scarce. Industry has been hesitant to employ Ph.Ds, and this trend is likely to continue. Therefore, the labour market for Ph.Ds in the industrial sector seems to be limited as well. In this context, it is worthwhile to explore in greater detail the relationship between field of study and eventual occupation of Ph.D. recipients.

The salary structure of Ph.D. holders indicates that the income level for this group is not very different from that of those graduates with a specialized undergraduate training or a master's degree, in spite of the additional years of advanced education.

The information in this report summarizes and highlights for the first time, the salient statistical characteristics of the Ph.D. population in Canada as of 1973.

.../ 12

TABLE I

PH.DS BY PROVINCE OF RESIDENCE AND SEX, 1973

	MALE	FEMALE	TOTAL	PERCENT	POPULATION 1971
Newfoundland	265	30	295	1.1	2.4
Prince Edward Island	65	5	70	0.3	0.5
Nova Scotia	735	75	805	2.9	3.7
New Brunswick	375	50	425	1.6	2.9
Quebec	5,175	595	5,770	21.1	27.9
Ontario	11,435	1,110	12,540	45.7	35.7
Manitoba	1,155	115	1,265	4.6	4.8
Saskatchewan	890	75	965	3.5	4.3
Alberta	2,335	195	2,525	9.2	7.5
British Columbia	2,495	230	2,725	9.9	10.1
Yukon & Northwest Territories	15	--	15	0.1	0.3
TOTAL, Canada	24,930	2,480	27,410	100.0	100.0
PERCENTAGE BY SEX	91.0	9.0			

Note: For all Highly Qualified Manpower Tables, the data are randomly rounded to multiples of 5, hence numbers will not always exactly equal totals.

TABLE II

LABOR FORCE STATUS OF MALE AND FEMALE PH.DS BY FIELD OF STUDY IN SELECTED DISCIPLINES, 1973

	LABOUR FORCE		NOT IN LABOUR FORCE		TOTAL PERCENT NOT IN LABOUR FORCE		
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	TOTAL
HUMANITIES AND RELATED							
Fine & Applied Arts	170	25	5	5	3.0	16.7	5.0
Classics	110	35	15	0	12.0	0.0	6.1
History	600	90	30	10	4.8	10.0	5.5
English	745	175	20	0	2.6	0.0	2.1
French	305	95	0	15	0.0	13.6	4.8
Other Modern Languages	260	125	15	10	5.5	7.4	7.2
Philosophy	690	70	35	15	4.8	17.6	6.2
Religion and Theology	1,015	15	65	0	6.0	0.0	5.5
Other Humanities	45	15	0	5	0.0	25.0	6.7
TOTAL	3,940	645	185	60	4.5	8.5	5.1
SOCIAL SCIENCES							
Anthropology	125	45	0	0	0.0	0.0	0.0
Business Administration and Commerce	275	0	0	0	0.0	0.0	0.0
Economics	885	25	15	0	1.6	0.0	1.6
Education	1,415	185	50	20	3.4	9.8	4.5
Geography	260	10	5	0	1.9	0.0	1.8
Law	265	25	10	5	3.6	16.7	4.9
Political Science	370	20	10	5	2.6	20.0	5.0
Psychology	1,260	275	20	20	1.6	6.8	2.5
Social Work	45	10	0	0	0.0	0.0	0.0
Sociology	380	50	5	0	1.3	0.0	1.1
Other Social Sciences	255	50	0	5	0.0	9.1	3.2
TOTAL	5,585	695	115	55	2.0	7.3	2.9
AGRICULTURE & BIOLOGICAL SCIENCES							
Agriculture	645	15	35	10	5.1	40.0	6.3
Biology	750	80	15	10	2.0	11.1	2.3
Botany	485	80	25	5	4.9	5.9	5.0
Household Science	45	35	0	0	0.0	0.0	6.3
Veterinary Medicine and Science	100	5	0	0	0.0	0.0	0.0
Zoology	810	65	40	15	4.7	18.8	5.9
Other Biological Sciences	0	0	0	0	0.0	0.0	0.0
TOTAL	2,835	280	115	40	3.9	12.5	4.7
HEALTH PROFESSIONS & OCCUPATIONS							
Dentistry	35	0	0	0	0.0	0.0	0.0
Medicine, Biochemistry and Related Medical Sciences	1,985	285	50	45	2.2	13.6	4.0
Pharmacy	110	15	10	0	8.3	0.0	7.7
Other Health Professions and Occupations	40	0	0	0	0.0	0.0	0.0
TOTAL	2,150	300	60	45	2.5	13.0	4.1
ENGINEERING AND APPLIED SCIENCES							
Architecture	10	0	0	0	0.0	0.0	0.0
Engineering	2,495	20	10	0	0.4	0.0	0.4
Other Applied Sciences	145	0	5	0	3.3	0.0	3.4
TOTAL	2,650	20	15	0	0.6	0.0	0.7
PHYSICAL SCIENCES							
Chemistry	2,855	120	35	35	1.2	2.3	2.3
Geology and Related	1,155	30	40	0	3.3	0.0	3.3
Mathematics, Pure & Applied	1,085	60	10	5	0.9	7.7	1.3
Physics	1,705	30	30	10	1.7	25.0	2.3
Other Physical Sciences	375	10	10	0	2.6	0.0	2.6
TOTAL	7,175	250	125	50	1.7	16.7	2.3

TABLE III

PH.DS AND UNIVERSITY FACULTY BY FIELD OF STUDY
IN SELECTED DISCIPLINES, 1973

	NUMBER IN THE LABOR FORCE	NUMBER OF UNIVERSITY FACULTY	PERCENT UNIVERSITY FACULTY	UNIVERSITY TEACHERS' FILE* (STATISTICS CANADA)
HUMANITIES AND RELATED				
Fine & Applied Arts	195	126	64.6	190
Classics	150	121	80.7	158
History	685	572	83.5	668
English	915	803	87.8	845
French	405	278	68.6	352
Other Modern Languages	390	305	78.2	538
Philosophy	760	494	65.0	441
Religion and Theology	1,030	331	32.1	306
Other Humanities	70	47	67.1	114
TOTAL	4,600	3,076	66.9	3,622
SOCIAL SCIENCES				
Anthropology	165	126	76.4	194
Business Administration and Commerce	275	189	68.7	389
Economics	910	541	59.5	546
Education	1,600	856	52.9	1,049
Geography	270	226	83.7	385
Law	290	95	32.8	79
Political Science	385	289	75.1	384
Psychology	1,535	998	65.0	905
Social Work	55	37	67.0	64
Sociology	435	389	89.4	447
Other Social Sciences	310	242	78.1	150
TOTAL	6,225	3,985	64.0	4,592
AGRICULTURE & BIOLOGICAL SCIENCES				
Agriculture	665	257	38.6	288
Biology	835	431	51.6	507
Botany	570	278	48.8	149
Household Science	80	63	78.8	81
Veterinary Medicine and Science	105	47	44.8	48
Zoology	870	441	50.7	247
Other Biological Sciences	--	--		150
TOTAL	3,125	1,517	48.5	1,470
HEALTH PROFESSIONS & OCCUPATIONS				
Dentistry	35	11	31.4	47
Medicine, Biochemistry and Related Medical Sciences	2,270	945	41.6	1,235
Pharmacy	120	58	48.3	109
Other Health Professions and Occupations	55	32	58.2	91
TOTAL	2,480	1,045	42.1	1,482
ENGINEERING AND APPLIED SCIENCES				
Engineering	2,515	1,082	43.0	1,264
Other Applied Sciences	145	31	21.4	110
TOTAL	2,660	1,118	42.0	1,374
PHYSICAL SCIENCES				
Chemistry	2,975	1,008	33.9	870
Geology and Related	1,185	410	34.6	371
Mathematics, Pure & Applied	1,150	992	86.3	849
Physics	1,735	845	48.7	806
Other Physical Sciences	380	100	26.3	465
TOTAL	7,425	3,355	45.2	3,361
GRAND TOTAL	26,485	14,096	53.2	15,901

TABLE IV

AGE STRUCTURE OF PH.DS, 1973

AGE GROUP	NUMBER	PERCENT
Younger than 29	1,020	3.7
29 - 33	5,325	19.4
34 - 43	10,715	39.2
44 - 53	6,200	22.6
Older than 53	4,150	15.1
TOTAL	27,410	100.0

TABLE V

YEAR OF PH.D. COMPLETION, 1973

YEAR OF COMPLETION	NUMBER	PERCENT
Before 1945	1,665	6.1
1945 - 1949	970	3.5
1950 - 1954	2,315	8.4
1955 - 1959	2,740	10.0
1960 - 1964	4,420	16.1
1965 - 1969	8,280	30.2
1970 - 1973	6,995	25.5
TOTAL	27,410	100.0

TABLE VI

GEOGRAPHIC ORIGIN OF PH.DS, 1973

	NUMBERS BY COUNTRY	NUMBERS BY REGION	PERCENT
Canada			
Atlantic Provinces	295 (2.5)		
Quebec	3,295 (28.4)		
Ontario	5,280 (45.5)		
Manitoba	370 (3.2)		
Saskatchewan	355 (3.1)		
Alberta	1,100 (9.5)		
British Columbia	900 (7.8)		
TOTAL, CANADA	(100.0)	11,595	42.4
United States		8,730	31.9
Europe			
Czechoslovakia	195 (3.1)		
France	815 (13.0)		
Germany	215 (3.4)		
Italy & Holy See	430 (6.9)		
Switzerland	170 (2.7)		
United Kingdom	3,820 (61.0)		
Others	615 (9.8)		
TOTAL, EUROPE		6,260	22.9
Australia & New Zealand		260	0.9
Asia (primarily India)		370	1.4
Other Countries (e.g., Africa, Latin America)		160	0.6
TOTAL, ALL COUNTRIES		27,410	100.0

Percentage is brackets provides regional breakdowns.

TABLE VII

IMMIGRATION OF PH.DS BY PROVINCE AND SEX, 1973

	MALE	FEMALE	TOTAL	PERCENT
Newfoundland	150	20	170	1.2
Prince Edward Island	40	--	40	0.3
Nova Scotia	350	45	395	2.8
New Brunswick	205	30	235	1.7
Quebec	2,070	345	2,415	17.4
Ontario	5,905	625	6,525	46.9
Manitoba	590	55	645	4.6
Saskatchewan	400	55	455	3.3
Alberta	1,305	130	1,435	10.3
British Columbia	1,420	170	1,595	11.5
CANADA	12,435	1,475	13,915	100.0
PERCENTAGE BY SEX	(89.4)	(10.6)		

TABLE VIII

FOREIGN BORN PH.DS BY COUNTRY OF BIRTH
AND PERIOD OF IMMIGRATION, 1973

	BEFORE 1955		1956-60		1961-65		1966-JUNE 1971		TOTAL NUMBER	PERCENT*
	NO.	%	NO.	%	NO.	%	NO.	%		
EUROPE										
United Kingdom	1,040	29.9	595	17.1	555	15.0	1,285	36.9	3,480	(25.0)
Germany	225	46.4	60	12.4	70	14.4	135	27.8	485	(3.5)
Soviet Union	335	77.9	30	7.0	15	3.5	50	11.6	430	(3.1)
Poland	225	63.4	40	11.3	20	5.6	70	19.7	355	(2.6)
France	85	27.0	20	6.3	75	23.8	125	39.7	315	(2.9)
Netherlands	145	56.9	60	23.5	45	17.6	15	5.9	255	(1.8)
Hungary	85	29.8	130	45.6	20	7.0	55	19.3	285	(2.0)
Czechoslavakia	70	21.5	5	1.5	10	3.1	225	69.2	325	(2.3)
Yugoslavia	60	57.1	5	4.8	15	14.3	20	19.0	105	(0.8)
Austria	70	66.7	10	9.5	10	9.5	15	14.3	105	(0.8)
Belgium	50	34.5	15	10.3	45	31.0	35	24.1	145	(1.0)
Greece	25	25.0	45	45.0	--	0.0	25	25.0	100	(0.7)
Spained & Portugal	10	10.0	15	15.0	25	25.0	50	50.0	100	(0.7)
Others: Europe	145	33.0	55	12.5	75	17.0	155	35.2	440	(3.2)
United States	435	12.7	220	6.4	600	17.6	2,110	61.8	3,415	(24.5)
India	60	5.7	95	9.0	250	23.8	665	62.4	1,050	(7.5)
China	80	16.7	50	10.4	125	26.0	215	44.8	480	(3.4)
Japan	25	18.5	--	0.0	25	18.5	80	59.3	135	(1.0)
Egypt & Libya	10	4.5	50	22.7	60	27.3	105	47.7	220	(1.6)
Other countries	60	10.3	75	12.9	140	24.1	295	50.9	580	(4.2)
TOTAL, ALL COUNTRIES	3,475	25.0	1,780	12.8	2,430	17.5	6,230	44.8	13,915	

*Percent in brackets show geographic distribution

TABLE IX

EMPLOYMENT OF PH.DS BY INDUSTRIAL SECTOR AND BY AGE, 1973

INDUSTRIAL SECTOR	YOUNGER THAN 34 %	34 - 44 %	OLDER THAN 44 %	NUMBER	PERCENT
Primary industries (e.g., agriculture, mining)	19.6	37.1	43.3	485	(1.8)
Manufacturing	26.7	36.4	36.4	1,290	(4.7)
Service industries (e.g., transportation, trade, finance)	24.7	27.2	46.9	395	(1.4)
Education and related	24.1	43.0	33.0	17,120	(62.4)
Health and Welfare Services	21.5	39.0	39.5	1,000	(3.6)
Religious Organizations	1.6	18.5	79.8	620	(2.3)
Other Services (e.g., community, business, personal)	18.2	20.5	56.8	225	(0.8)
Business Management	26.0	35.4	39.0	1,290	(4.7)
Federal Administration	20.5	37.3	42.0	3,090	(11.3)
Provincial Administration	24.5	34.7	42.2	735	(2.7)
Municipal Administration	30.0	40.0	40.0	50	(0.2)
Industry as unspecified or undefined	41.7	29.2	29.2	120	(0.4)
Did not work	20.9	11.9	66.2	1,005	(3.7)
TOTAL	23.1	39.1	37.8	27,410	(100.0)

Percentage in brackets provide breakdown by industrial sector.

TABLE X

SELECTED OCCUPATIONS OF PH.DS BY SEX, 1973

SELECTED OCCUPATION	MALE	PERCENT	FEMALE	PERCENT	TOTAL
Government Administrators	455	94.8	20	5.2	480
General Managers and Senior Officers	580	100.0	--	0.0	580
Administrators in Teaching	1,175	94.4	65	5.6	1,245
Other Managers and Administrators	915	94.3	55	5.7	970
Chemists	1,490	94.6	90	5.4	1,575
Geologists	605	99.2	10	0.8	610
Agriculturists and Related	570	100.0	--	0.0	570
Other Natural Scientists	1,15(	94.3	75	5.7	1,220
Engineers, Architects, System Analysts	1,490	96.1	60	3.9	1,550
Economists	185	94.9	5	5.1	195
Psychologists	295	80.8	65	19.2	365
Judges and Lawyers	115	92.0	10	8.0	125
Other Social Scientists	200	78.4	60	21.6	255
Ministers of Religion	570	96.6	20	0.0	590
University Teachers	12,155	90.5	1,270	9.5	13,425
Elementary and Secondary Teachers	260	82.5	55	17.5	315
Post-Secondary Non-University Teachers	410	82.0	90	18.0	500
Other Teachers and Related	225	67.2	110	32.8	335
Physicians and Surgeons	320	95.5	10	4.5	335
Dentists	20	100.0	--	0.0	25
Pharmacists	50	76.9	10	23.1	65
Other Health Occupations	50	90.9	5	9.1	55
Writers, Editors and Related Occupations	140	77.8	35	22.2	180
Clerical, and Service	105	95.5	10	4.5	110
Military and Policy Officers	160	97.0	5	3.0	165
Other Occupations	205	97.6	10	2.4	210
Not Stated	105	84.0	20	16.0	125
No Occupation	725	72.1	275	27.9	1,005
TOTAL	24,710	91.0	2,440	9.0	27,410

TABLE XI

AVERAGE INCOME OF PH.DS BY YEAR OF BIRTH AND BY SEX, 1973

YEAR OF BIRTH	MALE	FEMALE	DIFFERENCE
Before 1920 (over 50)	$20,000	$12,200	$ 7,800
1920 - 1929 (43 - 52)	23,600	13,200	10,400
1930 - 1934 (38 - 42)	21,600	12,500	9,100
1935 - 1939 (33 - 37)	18,300	12,200	6,100
1940 - 1944 (28 - 32)	14,500	11,200	3,300
1945 - 1949 (23 - 27)	10,600	8,800	1,800
TOTAL	$17,900	$10,900	$ 7,000

TABLE XII

AVERAGE INCOME SINCE AWARD OF PH.D. DEGREE BY SEX, 1973

YEARS	MALE	FEMALE	DIFFERENCE	PERCENTAGE OF MALE INCOME
0 - 2	$11,800	$ 9,400	$ 2,400	79.7
3 - 5	13,100	10,000	3,100	76.3
6 - 9	16,100	11,500	4,600	71.4
10 - 19	21,100	12,600	8,500	59.7
Over 19	22,800	12,300	10,500	53.9
TOTAL	$17,800	$10,800	$ 7,000	60.7

TABLE XIII

MEDIAN INCOME BY INDUSTRIAL SECTOR AND BY TYPE OF DEGREE, 1973

INDUSTRY	SPECIALIZED UNDERGRADUATE DEGREE	MASTERS DEGREE	EARNED DOCTORATE
Agriculture	$ 8,800	$ 9,500	$18,600
Mines	18,100	17,900	19,500
Manufacture	16,800	17,200	17,700
Business Management	17,700	17,700	18,900
Education	12,100	15,000	18,200
Federal Administration	15,700	17,000	19,800
Provincial Administration	14,700	15,600	17,900

TABLE XIV

AVERAGE MALE INCOME BY TYPE OF DEGREE IN SELECTED DISCIPLINES, 1973

	SPECIALIZED UNDERGRADUATE DEGREE	MASTERS DEGREE	EARNED DOCTORATE
Fine & Applied Arts	$11,900	$15,000	$16,800
Classics	15,100	14,900	17,400
History	13,900	15,200	17,900
English	16,000	14,800	18,300
French	12,700	13,800	17,800
Other Languages	12,400	14,200	18,100
Philosophy	13,900	13,800	17,200
Religion & Theology	7,700	8,500	10,500
Anthropology	14,500	13,700	18,100
Business Administration&Commerce	18,600	20,800	28,800
Economics	18,600	19,500	24,500
Geography	13,500	15,600	19,600
Law	24,200	26,700	20,000
Political Science	16,000	16,700	20,200
Psychology	12,300	15,600	20,200
Sociology	12,700	14,800	19,400
Agriculture	14,300	16,300	19,900
Biology	13,000	14,900	18,900
Botany	15,900	13,300	18,800
Household Science	17,000	18,400	20,300
Veterinary Medicine	19,600	20,300	20,300
Zoology	12,300	17,000	18,800
Biochemistry	15,200	24,000	21,400
Dentistry	26,800	37,000	25,800
Medicine & Surgery	35,900	42,500	37,600
Pharmacy	16,200	16,700	18,700
Engineering & Applied Sciences	18,800	17,900	20,200
Chemistry	15,900	17,700	19,500
Geology	17,400	18,000	20,700
Mathematics	15,900	15,400	18,200
Physics	15,500	14,500	19,300
TOTAL	$16,700	$17,200	$19,600